form multiple beams that will allow the antenna to connect to a second satellite in the constellation before the first satellite leaves the user's field of view. This capability is further accomplished by the claimed plurality of radiation elements positioned on a generally circular rotating plate. The rotating plate with the horizontal radiating elements allows the antenna to mechanically scan in azimuth, while electrically scan in elevation. The plate rotates the radiation elements such that their major axis is in alignment with a plurality of individual wave signals. The radiation elements provide an arc that scans the entire field of view to track equatorial satellites in the constellation.

Applicants' claimed invention is neither taught nor suggested by the Miura, et al. reference. Miura, et al., as acknowledged by the Examiner, teaches a two-dimensional radiation element configuration comprised of a planar patch of oppositely configured "x" or cross shaped radiation elements. Contrary to the Examiner's interpretation, Miura et al. can not be used with an equatorial satellite constellation to achieve Applicants' claimed invention as the radiation elements do not have a single major axis to be aligned with an incoming wavefront.

This is significant because, since Miura, et al. cannot both mechanically scan in azimuth (by rotating the plate) and scan electronically in elevation, it cannot find, track, and acquire a second satellite in an equatorial constellation before breaking connection with a first locked satellite. The present claimed antenna with a one-dimensional radiation element configuration is required by all claims and allows Applicants' claimed invention to be advantageously used with an equatorial satellite constellation.

Moreover, neither Barrett, et al. or Chang, et al. teach or disclose an antenna having a one-dimensional radiation element that is designed to be aligned such that their major axis is aligned with an incoming wavefront to track equatorial satellites and allow "hand off before breaking." Barrett, et al. teaches an antenna that is continually pointed at a transmitting satellite, which is providing a broadcast video signal. (Col. 3, lns 45-48). While Barrett, et al. teaches a one-dimensional radiation element configuration, Barrett, et al. specifically contemplates that the antenna will have areas where the signals can not be received due to noncontinuous satellite coverage. Barrett, et al. thus teaches away from Applicants' claimed invention requiring use with an equatorial satellite constellation to provide continuous coverage.

how does this support this

It is the Examiner's burden to show that there is some teaching or suggestion in the art to combine Miura, et al, Barrett, et al. and Chang, et al. to arrive at Applicants' claimed invention. However, the Examiner states that the Miura, et al. and Barrett, et al. do not

"prohibit/negate" operation with equatorial-orbit satellites. It is submitted that this analysis is backwards and requires the Applicants to demonstrate a lack of suggestion to combine -- as opposed to requiring the Examiner to demonstrate the necessary motivation or suggestion. Nevertheless, the configurations of these reference which are incapable of mechanically scanning in azimuth and electronically scanning in elevation such that the antenna can provide seamless handover from one equatorial satellite to another is not taught nor suggested by the prior art of record.

Thus, it is submitted that all objections and rejections of record have been overcome and that all pending claims are in connection for allowance. No new matter is believed to have been introduced via this amendment.

This Amendment after Final Action is being submitted to place the application in better condition for allowance or appeal. It is believed that it places the application in condition for allowance. Therefore, the Examiner is respectfully requested to enter this Amendment, consider it and grant allowance. A Notice of Allowability is therefore earnestly solicited.

If the Examiner should have any questions, he is urged to contact the undersigned at the below-listed number.

Respectfully submitted,

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VERSION WITH MARKINGS TO SHOW CHANGES MADE

1. (Twice Amended) An antenna for an equatorial satellite constellation for use on a commercial satellite terminal, comprising:

a generally circular rotating plate for mechanically scanning for wave signals in the azimuth direction;

a plurality of radiation elements positioned on said circular plate for electronically scanning for wave signals in elevation; and

a multiplexor associated with each of said plurality of radiation elements for consolidating the individual wave signals received at each of said plurality of radiation elements to an analog bit stream;

an analog to digital converter for converting said analog bit stream to a digital bit stream;

circuitry for forming multiple digital [beams] beam forms from said digital bit stream; and

a digital receiver for converting said digital [beamforms] beam forms into an information signal[.] ;

wherein the antenna is able to connect to a second equatorial satellite in the constellation before breaking from a first equatorial satellite during a hand-over.

Kindly substitute the following for pending Claim 7:

7. (Twice Amended) A phased array antenna for an equatorial satellite constellation, comprising:

a rotating plate for mechanically scanning for a wavefront of wave signals in an azimuth direction;

a plurality of radiation elements positioned on said rotating plate for receiving a plurality of individual waves;

apparatus for positioning said radiation elements such that a wavefront of an intended signal will be in alignment with a major axis of said plurality of radiation elements;

a plurality of multiplexer devices, each in communication with one of said plurality of radiation elements for converting said plurality of received individual waves into an analog bit stream;

an analog to digital converter for converting said analog bit stream to a digital bit stream;

a device for forming multiple digital beam forms from said digital bit stream; and

a digital receiver for processing said multiple digital beams[.] ;

wherein the antenna is able to connect to a second equatorial satellite in the constellation before breaking from a first equatorial satellite during a hand-over.

Kindly substitute the following for pending Claim 13:

13. (Twice Amended) A method for forming multiple beams at a commercial satellite antenna comprising:

providing a plurality of radiation elements on a surface of said commercial satellite antenna for receiving a plurality of individual wave signals;

rotating said plurality of radiation elements such that a wavefront of said plurality of individual wave signals is in alignment with a major axis of said plurality of radiation elements;

consolidating said plurality of wave signals into a single analog signal;

forming multiple beam forms from said single analog signal; and

transmitting said multiple beam forms to a plurality of satellites in an equatorial satellite constellation[.] ;

whereby the antenna is able to connect to a second equatorial satellite in the constellation before breaking from a first equatorial satellite during a hand-over.